Atty. Docket No. YOR20030192US1 (20140-00306-US)

## LISTING OF CLAIMS

1-13. (Canceled).

14. (Currently amended). A method of fabricating a high aspect ratio, solid-metal filled via comprising:

providing a semiconductor substrate;

defining a high aspect ratio via in said substrate, wherein said via has a bottom and at least one sidewall;

lining said via bottom and said at least one sidewall with a layer of an electrical insulator, wherein said insulator electrically isolates said via from said substrate;

lining said insulator with a layer of an adhesion promoter;

lining said adhesion promoter with a layer of a seed material;

coupling a laser radiation to at least one of said lining layers; and

using an LCVD process to fill [filling] said via with a solid metal.

- 15. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein the aspect ratio of said via is from about 3:1 to about 10:1.
- 16. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said via opens to a major surface of said semiconductor substrate.

Atty. Docket No. YOR20030192US1 (20140-00306-US)

17. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, further comprising:

lining said major surface with a stack comprising:

- a layer of an electrical insulator continuous with said insulator layer lining said via; a layer of an adhesion promoter continuous with said promoter layer lining said via; and a layer of a seed material continuous with said seed layer lining said via.
- 18. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said semiconductor substrate is selected from the group consisting of silicon, quartz, glass, and high temperature polymer.
- 19. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said insulator is selected from the group consisting of silicon nitride, silicon oxide, silicon oxynitride, and a SiN/SiO<sub>2</sub> stack.
- 20. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said adhesion promoter is selected from the group consisting of Ta, Cr, Ti, TaN, and TiN.
- 21. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said seed is selected from the group consisting of tungsten and molybdenum.

Atty. Docket No. YOR20030192US1 (20140-00306-US)

- 22. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein said solid-metal filler is selected from the group consisting of tungsten, molybdenum, tantalum, and gold.
- 23. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 14, wherein filling with a solid metal comprises a thermally-activated chemical vapor deposition (CVD) process.
- 24. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 23, wherein said CVD comprises laser-assisted CVD (LCVD).
- 25. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 24, wherein said LCVD comprises a continuous-wave laser.
- 26. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 24, wherein said laser couples with a material selected from the group consisting of said seed and said adhesion promoter.
- 27. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 26, wherein said LCVD further comprises:

providing an ambient comprising at least one precursor gas and at least one reducing gas;

forming a nucleation site for a growth of metal by forming a focus of said laser on said coupling material on said bottom of at least one of said vias;

Atty. Docket No. YOR20030192US1 (20140-00306-US)

depositing metal at said nucleation site; and continuing to deposit metal at a growing rate.

28. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 26, wherein said LCVD further comprises:

mounting said substrate on a three-axis mount; and

propagating the growth of a metal rod by moving said mount away from said focus at a rate substantially equal to said growing rate.

- 29. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, wherein said precursor gas is selected from the group consisting of WF<sub>6</sub>, WCl<sub>6</sub>, W(CO)<sub>6</sub>, MoF<sub>6</sub>, MoCl<sub>6</sub>, and Mo(CO)<sub>6</sub>.
- 30. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 29, wherein a preferred precursor gas is WF<sub>6</sub>.
- 31. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, wherein said reducing gas is selected from the group consisting of hydrogen and silane.
- 32. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, wherein said focus is formed by directing said laser through a lens.

Atty. Docket No. YOR20030192US1 (20140-00306-US)

33. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, further comprising;

providing an array of vias;

providing an array of lenses such that a focus is formed in each of said vias; and forming a metal rod in each of said vias.

34. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, further comprising;

providing an array of vias;

providing a mask having an array of voids defined therethrough, wherein said mask does not couple to said laser;

irradiating said array of vias through said mask; and forming a metal rod in each of said vias.

35. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, further comprising;

providing an array of vias;

providing a reaction chamber to contain said mount, said array of vias, and said ambient;

providing a mask having an array of voids defined therethrough, wherein said mask is positioned outside said chamber;

Atty. Docket No. YOR20030192US1 (20140-00306-US)

irradiating said array of vias through said mask; and forming a metal rod in each of said vias.

36. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, further comprising;

providing an array of vias;

providing a high pulse rate, laser microvia drill;

irradiating said array of vias using said microvia drill; and

forming a metal rod in each of said vias.

- 37. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 34, wherein said mask is a holographic phase mask.
- 38. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 24, wherein said LCVD comprises a pulsed laser.
- 39. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 17, further comprising:

polishing said via co-planar with said major surface by CMP.

40. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according

Atty. Docket No. YOR20030192US1 (20140-00306-US)

to claim 39, further comprising:

removing said adhesion layer and said seed layer from said major surface by CMP.

41. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 33, further comprising:

polishing said array of vias co-planar with said major surface by CMP.

42. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 27, further comprising:

forming an array of vias in said substrate;

mounting said substrate in a reaction chamber having a laser-transparent window;

forming a laser focus in each via of said array, thereby forming a nucleation site in each of said vias; and

forming a rod by translating said mount in a direction parallel to the beam of said laser.

43. (Original). The method of fabricating a high aspect ratio, solid-metal filled via, according to claim 25, wherein

said laser radiates at a wavelength that couples with the rod metal; and TiN, and wherein said laser does not couple to any of SiO<sub>2</sub>, SiN, and Si.

44. (Canceled).